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PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2000-123238

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(21)Application number : 10-298906

(71)Applicant : SANYO ELECTRIC CO LTD

(22)Date of filing : 20.10.1998

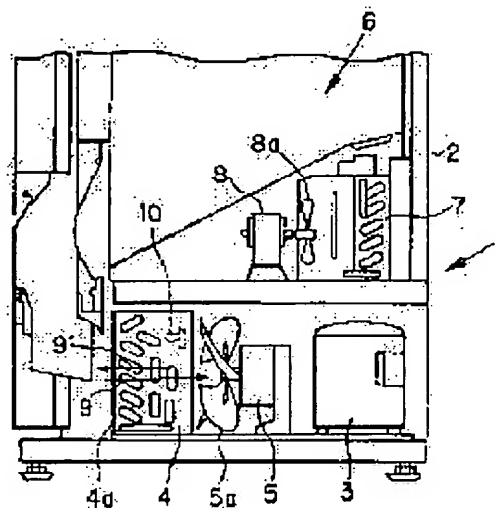
(72)Inventor : TANAI TAKEHITO

(54) COOLING DEVICE OF AUTOMATIC VENDING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a cooling device of an automatic vending machine capable of preventing the deterioration of the heat exchanging performance of a condenser due to clogging, and saving energy by saving the waste of power consumption.

SOLUTION: When an accumulative time in which the temperature of a condenser detected by a condenser temperature detecting sensor 10 is beyond a set temperature reaches a set time, and a compressor 3 is turned off, a cooling controlling part inversely drives a fan motor 5 for a condenser. Then, a fan 5a for the condenser is inversely rotated, and wind 9' is allowed to flow from a condenser 4 side to the side of a filter 4a for the condenser so that dust on the filter 4a for the condenser can be removed.



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DERWENT-ACC-NO: 2000-371727
DERWENT-WEEK: 200032
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TITLE: Cooling system of automatic vending machine,
controls fan motor based
on detected condenser temperature and rotates fan in preset
direction and
reverse direction

PATENT-ASSIGNEE: SANYO ELECTRIC CO LTD[SAOL]

PRIORITY-DATA: 1998JP-0298906 (October 20, 1998)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE
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007	G07F 009/10	

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APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO
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INT-CL (IPC): F25D011/00; F25D017/06 ; G07F009/10

ABSTRACTED-PUB-NO: JP2000123238A

BASIC-ABSTRACT: NOVELTY - Temperature sensor detects
temperature in goods
accommodation chamber (6) and condenser temperature sensor
(10) detects
temperature of condenser (4). Based on the temperature of
chamber (6), ON/OFF
of a compressor (3) and fan motor (5) is performed. A
controller controls the
fan motor based on detected condenser temperature and
rotates fan (5a) in
preset direction and reverse direction.

USE - For cooling goods in accommodation chamber of
automatic vending machine.

ADVANTAGE - As fan is rotated in a preset direction and reverse direction whenever required, dust deposited on the condenser is removed. Reduction in heat exchange capability of the condenser by clogging is prevented. Wastage of power consumption is reduced thus energy saving is attained.

DESCRIPTION OF DRAWING(S) - The figure shows the cross section of cooling system.

Compressor 3

Condenser 4

Fan motor 5

Fan 5a

Goods accommodation chamber 6

Condenser temperature sensor 10

CHOSEN-DRAWING: Dwg.1/7

TITLE-TERMS:

COOLING SYSTEM AUTOMATIC VENDING MACHINE CONTROL FAN MOTOR
BASED DETECT
CONDENSER TEMPERATURE ROTATING FAN PRESET DIRECTION REVERSE
DIRECTION

DERWENT-CLASS: Q75 T05

EPI-CODES: T05-H04; T05-H08A;

SECONDARY-ACC-NO:

Non-CPI Secondary Accession Numbers: N2000-278752

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特開2000-123238

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Fターム(参考) 3E044 DB16 FB11 FB12

3L045 AA02 BA01 CA02 DA02 EA01

GA04 HA01 LA01 LA05 LA09

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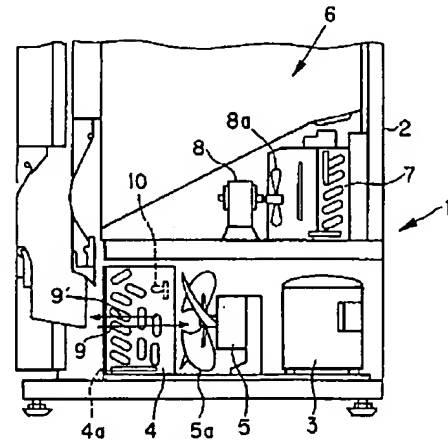
NA19

(54)【発明の名称】 自動販売機の冷却装置

(57)【要約】

【課題】 目詰まりによる凝縮器の熱交換性能の低下を防ぐとともに、消費電力の無駄を省いて省エネルギー化を図った自動販売機の冷却装置を提供する。

【解決手段】 凝縮器温度検出センサ10が検出した凝縮器温度が設定温度を超えた累積時間が設定時間に達し、かつ、圧縮機3がオフのとき、冷却制御部は、凝縮器用ファンモータ5を逆転駆動する。凝縮器用ファン5aが逆転して風9'が凝縮器4側から凝縮器用フィルタ4a側に流れ、凝縮器用フィルタ4a上の塵埃が除去される。



【特許請求の範囲】

【請求項1】商品収容庫内を冷却する自動販売機の冷却装置において、

冷媒を圧縮する圧縮機と、

前記圧縮機によって圧縮された冷媒を凝縮する凝縮器と、ファンを所定の方向に回転させて前記凝縮器に冷却風を供給するファンモータと、

前記商品収容庫内の温度を検出する庫内温度検出センサと、

前記凝縮器の温度を検出する凝縮器温度検出センサと、
前記庫内温度検出センサが検出した前記商品収容庫内の温度に基づいて前記圧縮機および前記ファンモータをオン／オフするとともに、前記凝縮器温度検出センサが検出した前記凝縮器の温度に基づいて前記ファンモータを制御して前記ファンを前記所定の方向と逆方向に回転させる制御手段とを備えたことを特徴とする自動販売機の冷却装置。

【請求項2】前記制御手段は、前記圧縮機がオフしているとき、前記ファンを前記所定の方向と逆方向に回転させる構成の請求項1記載の自動販売機の冷却装置。

【請求項3】前記制御手段は、前記凝縮器の温度が予め設定された温度を所定の回数超えたとき、前記ファンを前記所定の方向と逆方向に回転させる構成の請求項1記載の自動販売機の冷却装置。

【請求項4】前記制御手段は、前記凝縮器の温度の上昇率が予め設定された上昇率より大きくなったとき、前記ファンを前記所定の方向と逆方向に回転させる構成の請求項1記載の自動販売機の冷却装置。

【請求項5】商品収容庫内を冷却する自動販売機の冷却装置において、

冷媒を圧縮する圧縮機と、

前記圧縮機によって圧縮された冷媒を凝縮する凝縮器と、ファンを所定の方向に回転させて前記凝縮器に冷却風を供給するファンモータと、

前記商品収容庫内の温度を検出する庫内温度検出センサと、

前記凝縮器の温度を検出する凝縮器温度検出センサと、前記凝縮器の周辺の外気温度を検出する外気温度検出センサと、

前記庫内温度検出センサが検出した前記商品収容庫内の温度に基づいて前記圧縮機および前記ファンモータをオン／オフするとともに、前記凝縮器温度検出センサが検出した前記凝縮器の温度と前記外気温度検出センサが検出した前記外気温度との温度差を求め、前記温度差に基づいて前記ファンモータを制御して前記ファンを前記所定の方向と逆方向に回転させる制御手段とを備えたことを特徴とする自動販売機の冷却装置。

【請求項6】商品収容庫内を冷却する自動販売機の冷却装置において、

冷媒を圧縮する圧縮機と、

前記圧縮機によって圧縮された冷媒を凝縮する凝縮器と、ファンを所定の方向に回転させて前記凝縮器に冷却風を供給するファンモータと、

前記商品収容庫内の温度を検出する庫内温度検出センサと、

前記庫内温度検出センサが検出した前記商品収容庫内の温度に基づいて前記圧縮機および前記ファンモータをオン／オフするとともに、所定の時間帯であって、前記圧縮機がオフのとき、前記ファンモータを制御して前記ファンを前記所定の方向と逆方向に回転させる制御手段とを備えたことを特徴とする自動販売機の冷却装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、自動販売機の冷却装置に関し、特に、目詰まりによる凝縮器の熱交換性能の低下を防ぐとともに、消費電力の無駄を省いて省エネルギー化を図った自動販売機の冷却装置に関する。

【0002】

【従来の技術】自動販売機の商品収容庫内を冷却する従来の冷却装置としては、例えば、特開平4-366366号公報に示されるものがある。この冷却装置は、冷媒を圧縮する圧縮機と、圧縮機によって圧縮された冷媒を凝縮する凝縮器と、ファンを正転させて凝縮器にフィルタを介して冷却風を供給するファンモータと、圧縮機のオン時間を累積カウントするタイマと、タイマの計数値が予め設定された設定値に達すると、ファンモータを逆転駆動する制御部とを有している。

【0003】上記の構成において圧縮機のオン時間が所定の設定時間に達すると、制御部はファンモータを逆転駆動し、風が凝縮器側からフィルタ側に流れ、フィルタに堆積した埃、ゴミ等の塵埃が除去される。これにより、サービス員がフィルタを洗浄、乾燥する手間が省け、フィルタの目詰まりによる凝縮器の熱交換性能の低下を防ぐことができる。

【0004】

【発明が解決しようとする課題】しかし、従来の自動販売機の冷却装置によると、フィルタに堆積した塵埃の量によらず、一定時間運転する毎にファンモータを逆転駆動しているので、フィルタに塵埃があまり堆積していない場合でも、ファンモータを逆転駆動することがあり、消費電力の無駄を生じていた。

【0005】従って、本発明の目的は、目詰まりによる凝縮器の熱交換性能の低下を防ぐとともに、消費電力の無駄を省いて省エネルギー化を図った自動販売機の冷却装置を提供することにある。

【0006】

【課題を解決するための手段】本発明は、上記目的を達成するため、商品収容庫内を冷却する自動販売機の冷却装置において、冷媒を圧縮する圧縮機と、前記圧縮機によって圧縮された冷媒を凝縮する凝縮器と、ファンを所定

の方向に回転させて前記凝縮器に冷却風を供給するファンモータと、前記商品収容庫内の温度を検出する庫内温度検出センサと、前記凝縮器の温度を検出する凝縮器温度検出センサと、前記庫内温度検出センサが検出した前記商品収容庫内の温度に基づいて前記圧縮機および前記ファンモータをオン／オフするとともに、前記凝縮器温度検出センサが検出した前記凝縮器の温度に基づいて前記ファンモータを制御して前記ファンを前記所定の方向と逆方向に回転させる制御手段とを備えたことを特徴とする自動販売機の冷却装置を提供する。上記構成によれば、ファンを所定の方向に回転させ、凝縮器に塵埃が堆積してくると、冷却風の風量が低下して凝縮器の温度が上昇し、凝縮器の熱交換性能が低下してくる。そこで、凝縮器の温度に基づいてファンを所定の方向と逆方向に回転させることにより、風が運転時とは逆方向に流れ、凝縮器に堆積した塵埃が除去され、凝縮器の熱交換性能が回復する。

【0007】本発明は、上記目的を達成するため、商品収容庫内を冷却する自動販売機の冷却装置において、冷媒を圧縮する圧縮機と、前記圧縮機によって圧縮された冷媒を凝縮する凝縮器と、ファンを所定の方向に回転させて前記凝縮器に冷却風を供給するファンモータと、前記商品収容庫内の温度を検出する庫内温度検出センサと、前記凝縮器の温度を検出する凝縮器温度検出センサと、前記凝縮器の周辺の外気温度を検出する外気温度検出センサと、前記庫内温度検出センサが検出した前記商品収容庫内の温度に基づいて前記圧縮機および前記ファンモータをオン／オフするとともに、前記凝縮器温度検出センサが検出した前記凝縮器の温度と前記外気温度検出センサが検出した前記外気温度との温度差を求め、前記温度差に基づいて前記ファンモータを制御して前記ファンを前記所定の方向と逆方向に回転させる制御手段とを備えたことを特徴とする自動販売機の冷却装置を提供する。上記構成によれば、ファンを所定の方向に回転させ、凝縮器に塵埃が堆積してくると、冷却風の風量が低下して凝縮器の温度が上昇し、凝縮器の熱交換性能が低下してくる。また、凝縮器の温度は、外気温度にも依存する。そこで、凝縮器の温度と外気温度との温度差が予め設定された温度差より大きくなったとき、ファンを所定の方向と逆方向に回転させることにより、適正なタイミングで風が運転時とは逆方向に流れ、凝縮器に堆積した塵埃が除去され、凝縮器の熱交換性能が回復する。

【0008】本発明は、上記目的を達成するため、商品収容庫内を冷却する自動販売機の冷却装置において、冷媒を圧縮する圧縮機と、前記圧縮機によって圧縮された冷媒を凝縮する凝縮器と、ファンを所定の方向に回転させて前記凝縮器に冷却風を供給するファンモータと、前記商品収容庫内の温度を検出する庫内温度検出センサと、前記庫内温度検出センサが検出した前記商品収容庫内の温度に基づいて前記圧縮機および前記ファンモータをオ

ン／オフするとともに、所定の時間帯であって、前記圧縮機がオフのとき、前記ファンモータを制御して前記ファンを前記所定の方向と逆方向に回転させる制御手段とを備えたことを特徴とする自動販売機の冷却装置を提供する。上記構成によれば、ファンを所定の方向に回転させ、凝縮器に塵埃が堆積してくると、冷却風の風量が低下して凝縮器の温度が上昇し、凝縮器の熱交換性能が低下してくる。そこで、所定の時間帯、例えば、朝、圧縮機がオフのとき、ファンを所定の方向と逆方向に回転させることにより、風が運転時とは逆方向に流れ、凝縮器に堆積した塵埃が除去され、凝縮器の熱交換性能が回復する。

【0009】

【発明の実施の形態】図1は、本発明の第1の実施の形態に係る自動販売機の冷却装置を示す。この冷却装置1は、自動販売機本体2の下部に、冷媒を圧縮する圧縮機3と、圧縮機3によって圧縮された冷媒を凝縮する凝縮器4と、凝縮器4の前面に設けられた着脱自在の凝縮器用フィルタ4aと、凝縮器用ファン5aを正転させて凝縮器4にフィルタ4aを介して冷却風9を供給する正逆転駆動が可能な凝縮器用ファンモータ5と、凝縮器4の温度（凝縮器温度）を検出して凝縮器温度検出信号を出力する凝縮器温度検出センサ10とを配置し、自動販売機本体2の上部の商品収容庫6内に、凝縮器4によって凝縮された冷媒を蒸発させ、この蒸発の際に得られる冷熱によって周囲を冷却する蒸発器7と、蒸発器用ファン8aを回転させて蒸発器7からの冷気を商品収容庫6内に強制的に循環させる蒸発器用ファンモータ8と、商品収容庫6内の温度（庫内温度）を検出して庫内温度検出信号を出力する後述する庫内温度検出センサとを配置している。

【0010】図2は、冷却装置1の制御系を示す。冷却装置1は、この冷却装置1全体を制御する冷却制御部20を有し、冷却制御部20に、上記圧縮機3、凝縮器用ファンモータ5、凝縮器温度検出センサ10および庫内温度検出センサ21を各々接続し、さらに、予め設定された温度や時間等の各種の情報を記憶するメモリ22、および経過時間（累積時間）を計時するタイマ23を各々接続している。

【0011】冷却制御部12は、商品収容庫6内の温度が設定された庫内温度を保つように圧縮機3および凝縮器用ファンモータ5のオン／オフ制御を行うとともに、凝縮器用フィルタ4aが目詰まりしないように、所定のタイミングで凝縮器用ファンモータ5を逆転駆動するものである。

【0012】次に、第1の実施の形態の動作を説明する。

【0013】図3は、凝縮器用ファンモータ5の動作を示す。冷却制御部20は、図示しない主制御部からの起動信号の入力に基づき、タイマ23の値をクリアすると

ともに、庫内温度検出センサ21からの庫内温度検出信号に基づいて商品収容庫6内の温度が設定された庫内温度を保つように圧縮機3および凝縮器用ファンモータ5のオン/オフ制御を行う。すなわち、冷却制御部20は、庫内温度が設定された上限温度まで上がると、圧縮機3をオンするとともに、凝縮器用ファンモータ5をオン（正転駆動）する。凝縮器用ファン5aは、正転して風9がフィルタ4a側から凝縮器4側に流れ、凝縮器4が冷却される。庫内温度が設定された下限温度まで下がると、圧縮機3および凝縮器用ファンモータ5をオフする。

【0014】また、冷却制御部20は、周期的に凝縮器温度検出センサ10から凝縮器温度検出信号を入力し、凝縮器温度とメモリ23に記憶されている設定温度とを比較し、凝縮器温度が設定温度を超えると、タイマ23にその超えている累積時間 T_1 を計時させる。凝縮器温度が設定温度より下がると、タイマ23による計時を停止させる。再び、凝縮器温度が設定温度を超えると、タイマ23にその超えている累積時間 $(t_1 + t_2)$ を計時させる。タイマ23による累積時間 $(t_1 + t_2 + t_3)$ がメモリ23に記憶されている設定累積時間に達し、かつ、圧縮機3がオフのとき、冷却制御部20は、タイマ23をクリアし、凝縮器用ファンモータ5を逆転駆動し、その逆転駆動している時間をタイマ23により計時する。凝縮器用ファンモータ5の逆転駆動により凝縮器用ファン5aは逆転して風9'が凝縮器4側から凝縮器用フィルタ4a側に流れ、凝縮器用フィルタ4a上の塵、ごみ等の塵埃が除去される。タイマ23の計数値がメモリ22が記憶する設定駆動時間（例えば、5分）に達すると、タイマ23をクリアし、凝縮器用ファンモータ5の逆転駆動を停止する。

【0015】上述した第1の実施の形態によれば、凝縮器温度が設定温度を超えた累積時間によって凝縮器用ファンモータ5を逆転駆動してフィルタ4a上の塵埃を除去しているので、フィルタ4aの目詰まりによる凝縮器4の熱交換性能の低下を防げる。また、フィルタ4aに堆積した塵埃の除去が必要なときであって、圧縮機3がオフしているときに、ファンモータ5を逆転駆動しているので、冷却性能に影響を与えないので、コールド商品の温度に影響を与えなくてすむ。

【0016】図4は、本発明の第2の実施の形態に係る冷却装置の制御系を示す。この冷却装置は、この冷却装置1全体を制御する冷却制御部20を有し、冷却制御部20に、上記圧縮機3、凝縮器用ファンモータ5、凝縮器温度検出センサ10、庫内温度検出センサ21、予め設定された時間等の各種の情報を記憶するメモリ22、およびタイマ23を各々接続し、現時点の年、月、日、時、分、秒の時刻情報を出力する時計・カレンダー24を各々接続している。

【0017】次に、第2の実施の形態の動作を説明す

る。

【0018】図5は、凝縮器用ファンモータ5の動作を示す。冷却制御部20は、図示しない主制御部から起動信号の入力に基づき、タイマ23の値をクリアするとともに、庫内温度検出センサ21からの庫内温度検出信号に基づいて商品収容庫6内の温度が設定された庫内温度を保つように圧縮機3および凝縮器用ファンモータ5のオン/オフ制御を行う。

【0019】また、冷却制御部20は、時計・カレンダー24からの時刻情報に基づいて日付が変わったと判断すると、本日の最初に圧縮機3がオフになったとき、タイマ23をクリアし、凝縮器用ファンモータ5を逆転駆動し、その逆転駆動している時間をタイマ23により計時する。凝縮器用ファンモータ5の逆転駆動により凝縮器用ファン5aは逆転して風9'が凝縮器4側から凝縮器用フィルタ4a側に流れ、凝縮器用フィルタ4a上の塵埃が除去される。タイマ23の計数値がメモリ22が記憶する設定駆動時間（例えば、5分）に達すると、タイマ23をクリアし、凝縮器用ファンモータ5の逆転駆動を停止する。

【0020】上述した第2の実施の形態によれば、所定の時間帯であって、圧縮機3がオフのときに、凝縮器用ファンモータ5を逆転駆動しているので、第1の実施の形態と同様に、凝縮器4の熱交換性能の低下を防げ、省エネルギー化が可能になる。また、第1の実施の形態のように累積時間を計時する必要がないため、凝縮器用ファンモータ5の駆動制御を容易に行うことができる。

【0021】図6は、本発明の第3の実施の形態に係る冷却装置の制御系を示す。この冷却装置は、この冷却装置1全体を制御する冷却制御部20を有し、冷却制御部20に、上記圧縮機3、凝縮器用ファンモータ5、凝縮器温度検出センサ10、庫内温度検出センサ21、予め設定された温度や時間等の各種の情報を記憶するメモリ22、およびタイマ23を各々接続するとともに、凝縮器4周辺の外気の温度を検出する外気温度検出センサ25を接続している。

【0022】次に、第3の実施の形態の動作を説明する。

【0023】図7は、凝縮器用ファンモータ5の動作を示す。冷却制御部20は、図示しない主制御部からの起動信号の入力に基づき、タイマ23の値をクリアするとともに、庫内温度検出センサ21からの庫内温度検出信号に基づいて商品収容庫6内の温度が設定された庫内温度を保つように圧縮機3および凝縮器用ファンモータ5のオン/オフ制御を行う。

【0024】また、冷却制御部20は、凝縮器温度検出センサ10からの凝縮器温度検出信号と外気温度検出センサ25からの外気温度検出信号に基づいて、凝縮器温度と外気温度との温度差 ΔT を求め、この温度差 ΔT がメモリ22に記憶されている設定温度差を超え、かつ、

圧縮機3がオフになっているとき、冷却制御部20は、タイマ23をクリアし、凝縮器用ファンモータ5を逆転駆動し、その逆転駆動している時間をタイマ23により計時する。凝縮器用ファンモータ5の逆転駆動により凝縮器用ファン5aは逆転して風9'が凝縮器4側から凝縮器用フィルタ4a側に流れ、凝縮器用フィルタ4a上の塵埃が除去される。タイマ23の計数値がメモリ22が記憶する設定駆動時間(例えば、5分)に達すると、タイマ23をクリアし、凝縮器用ファンモータ5の逆転駆動を停止する。

【0025】上述した第3の実施の形態によれば、凝縮器温度と外気温度との温度差が設定温度差を超え、かつ、圧縮機3がオフになっているとき、凝縮器用ファンモータ5を逆転駆動しているため、第1の実施の形態と同様に、凝縮器4の熱交換性能の低下を防げ、省エネルギー化が可能になる。また、凝縮器温度と外気温度との温度差に基づいて凝縮器用ファンモータ5を逆転駆動しているため、第1の実施の形態よりも適正なタイミングでフィルタ4a上の塵埃を除去できる。

【0026】なお、本発明は、上記実施の形態に限定されず、種々種々に変形実施が可能である。例えば、凝縮器温度が予め設定された温度を所定の回数(1回含む)を超えたとき、凝縮器用ファン4aを逆転させてもよい。また、凝縮器温度の上昇率が予め設定された上昇率より大きくなったとき、凝縮器用ファン4aを逆転させてもよい。また、第2の実施の形態では、凝縮器用ファンモータ5を逆転駆動させる時間帯を毎朝1回に設定したが、一日に朝、夕各々1回というように1日に複数回設定してもよく、何日に1回、あるいは何週間に1回というように任意に設定してもよい。また、本発明は、フィ

【0027】

【発明の効果】以上説明した通り、本発明の自動販売機の冷却装置によれば、必要なときにファンを所定の方向と逆方向に回転させて凝縮器に堆積した塵埃を除去しているため、目詰まりによる凝縮器の熱交換性能の低下を防げるとともに、消費電力の無駄を省いて省エネルギー

化が図れる。

【図面の簡単な説明】

【図1】本発明の第1の実施の形態に係る自動販売機の冷却装置を示す縦断面図である。

【図2】第1の実施の形態に係る冷却装置の制御系を示すブロック図である。

【図3】第1の実施の形態に係る凝縮器用ファンモータの動作を示すタイミングチャートである。

【図4】本発明の第2の実施の形態に係る冷却装置の制御系を示すブロック図である。

【図5】第2の実施の形態に係る凝縮器用ファンモータの動作を示すタイミングチャートである。

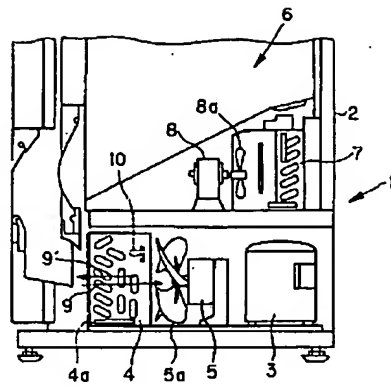
【図6】本発明の第3の実施の形態に係る冷却装置の制御系を示すブロック図である。

【図7】第3の実施の形態に係る凝縮器用ファンモータの動作を示すタイミングチャートである。

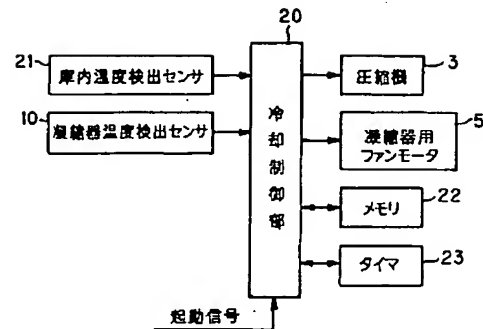
【符号の説明】

- 1 冷却装置
- 2 自動販売機本体
- 3 圧縮機
- 4 凝縮器
- 4a 凝縮器用フィルタ
- 5 凝縮器用ファンモータ
- 5a 凝縮器用ファン
- 6 商品収容庫
- 7 蒸発器
- 8 蒸発器用ファンモータ
- 8a 蒸発器用ファン
- 9, 9' 風
- 10 凝縮器温度検出センサ
- 20 冷却制御部
- 21 庫内温度検出センサ
- 22 メモリ
- 23 タイマ
- 24 時計・カレンダー
- 25 外気温度検出センサ
- ΔT 温度差

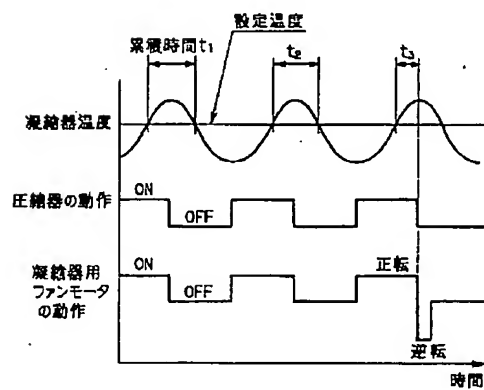
【図1】



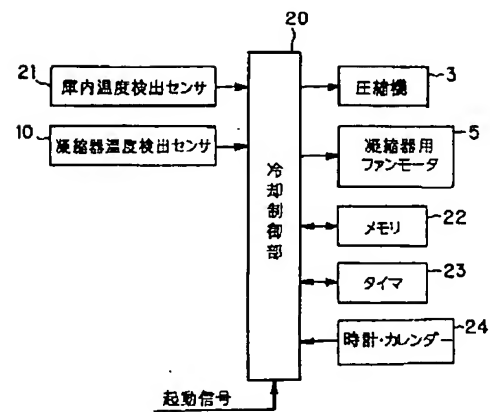
【図2】



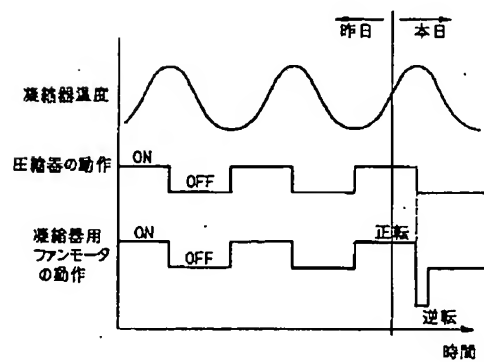
【図3】



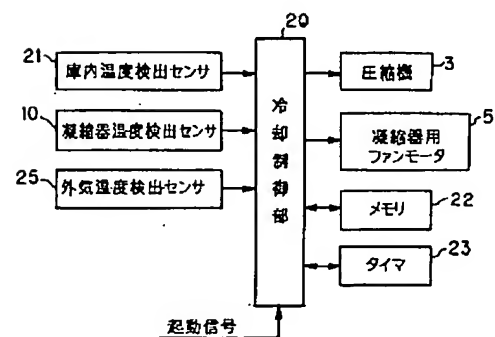
【図4】



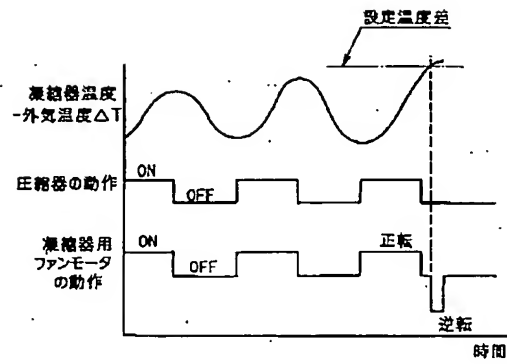
【図5】



【図6】



【図7】



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CLAIMS

[Claim(s)]

[Claim 1] The cooling system of the vending machine which cools the inside of a goods hold warehouse characterized by providing the following. The compressor which compresses a refrigerant. the aforementioned compressor -- the condenser which condenses the compressed refrigerant The fan motor which a fan is rotated in the predetermined direction and supplies a cooling wind to the aforementioned condenser. The temperature detection sensor in a warehouse which detects the temperature in the aforementioned goods hold warehouse, and the condenser temperature detection sensor which detects the temperature of the aforementioned condenser, While being based on the temperature in the aforementioned goods hold warehouse which the aforementioned temperature detection sensor in a warehouse detected and turning on / turning off the aforementioned compressor and the aforementioned fan motor Control means which the aforementioned fan motor is controlled [control means] based on the temperature of the aforementioned condenser which the aforementioned condenser temperature detection sensor detected, and make a direction and an opposite direction predetermined [aforementioned] rotate the aforementioned fan.

[Claim 2] The aforementioned control means are the cooling systems of the vending machine of composition of making a direction and an opposite direction predetermined [aforementioned] rotate the aforementioned fan, when the aforementioned compressor turns off according to claim 1.

[Claim 3] The aforementioned control means are the cooling systems of the vending machine of composition of making a direction and an opposite direction predetermined [aforementioned] rotate the aforementioned fan, when the temperature of the aforementioned condenser exceeds the predetermined number of the temperature set up beforehand according to claim 1.

[Claim 4] The aforementioned control means are the cooling systems of the vending machine of composition of making a direction and an opposite direction predetermined [aforementioned] rotate the aforementioned fan, when the R/C of the temperature of the aforementioned condenser becomes larger than the R/C set up beforehand according to claim 1.

[Claim 5] The cooling system of the vending machine which cools the inside of a goods hold warehouse characterized by providing the following. The compressor which compresses a refrigerant. the aforementioned compressor -- the condenser which condenses the compressed refrigerant The fan motor which a fan is rotated in the predetermined direction and supplies a cooling wind to the aforementioned condenser. The temperature detection sensor in a warehouse which detects the temperature in the aforementioned goods hold warehouse, and the condenser temperature detection sensor which detects the temperature of the aforementioned condenser, While being based on the temperature in the aforementioned goods hold warehouse which the OAT detection sensor which detects the surrounding OAT of the aforementioned condenser, and the aforementioned temperature detection sensor in a warehouse detected and turning on / turning off the aforementioned compressor and the aforementioned fan motor Control means which the temperature gradient of the temperature of the aforementioned condenser which the aforementioned condenser temperature detection sensor detected, and the aforementioned OAT which the aforementioned OAT detection sensor detected is searched for [control means], and the aforementioned fan motor is controlled [control means] based on the aforementioned temperature gradient, and make a direction and an opposite direction predetermined [aforementioned] rotate the aforementioned fan.

[Claim 6] The cooling system of the vending machine which cools the inside of a goods hold warehouse characterized by providing the following. The compressor which compresses a refrigerant. the aforementioned compressor -- the condenser which condenses the compressed refrigerant The fan motor which a fan is rotated in the predetermined direction and supplies a cooling wind to the aforementioned condenser. The control means which it is a predetermined time zone, and the aforementioned fan motor controls [control means] and make a direction and an opposite direction predetermined [aforementioned] rotate the aforementioned fan while being based on the temperature in the aforementioned goods hold warehouse which the temperature detection sensor in a warehouse which detects the temperature in the aforementioned goods hold warehouse, and the aforementioned temperature detection sensor in a warehouse detected and turning on/turning off the aforementioned compressor and the aforementioned fan motor when the aforementioned compressor is OFF.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] Especially this invention relates to the cooling system of the vending machine which excluded the futility of power consumption and attained energy saving while preventing the heat-exchange performance degradation of the condenser by blinding about the cooling system of a vending machine.

[0002]

[Description of the Prior Art] As a conventional cooling system which cools the inside of the goods hold warehouse of a vending machine, there are some which are shown in JP,4-366366,A, for example. This cooling system has the control section which carries out the inversion drive of the fan motor, if the enumerated data of the compressor which compresses a refrigerant, the condenser which condenses the refrigerant compressed by the compressor, the fan motor which is made to rotate a fan normally and supplies a cooling wind to a condenser through a filter, the timer which carries out the accumulation count of the ON time of a compressor, and a timer reaches the set point set up beforehand.

[0003] If the ON time of a compressor reaches the predetermined setup time in the above-mentioned composition, a control section will carry out the inversion drive of the fan motor, a wind will flow from a condenser side to a filter side, and dust deposited on the filter, such as dust and a contaminant, will be removed. The time and effort to which a service member washes and dries a filter can be saved by this, and the heat-exchange performance degradation of the condenser by the blinding of a filter can be prevented.

[0004]

[Problem(s) to be Solved by the Invention] However, according to the cooling system of the conventional vending machine, it was not based on the amount of the dust deposited on the filter, but since the inversion drive of the fan motor was carried out whenever it carried out fixed time operation, even when dust had seldom accumulated on a filter, the inversion drive of the fan motor might be carried out, and the futility of power consumption had been produced.

[0005] Therefore, the purpose of this invention is to offer the cooling system of the vending machine which excluded the futility of power consumption and attained energy saving while preventing the heat-exchange performance degradation of the condenser by blinding.

[0006]

[Means for Solving the Problem] In the cooling system of the vending machine which cools the inside of a goods hold warehouse in order that this invention may attain the above-mentioned purpose the compressor which compresses a refrigerant, and the aforementioned compressor -- with the condenser which condenses the compressed refrigerant The fan motor which a fan is rotated in the predetermined direction and supplies a cooling wind to the aforementioned condenser, The temperature detection sensor in a warehouse which detects the temperature in the aforementioned goods hold warehouse, and the condenser temperature detection sensor which detects the temperature of the aforementioned condenser, While being based on the temperature in the aforementioned goods hold warehouse which the aforementioned temperature detection sensor in a warehouse detected and turning on / turning off the aforementioned compressor and the aforementioned fan motor The cooling system of the vending machine characterized by having the control means which the aforementioned fan motor is controlled [control means] based on the temperature of the aforementioned condenser which the aforementioned condenser temperature detection sensor detected, and make a direction and an opposite direction predetermined [aforementioned] rotate the aforementioned fan is offered. If according to the above-mentioned composition a fan is rotated in the predetermined direction and dust accumulates on a condenser, the air capacity of the cooling style falls, the temperature of a condenser will rise and the heat-exchange performance of a condenser will fall. Then, by making a predetermined direction and a predetermined opposite direction rotate a fan based on the temperature of a condenser, a wind flows to an opposite direction at the time of operation, the dust deposited on the condenser is removed, and the heat-exchange performance of a condenser is recovered.

[0007] In the cooling system of the vending machine which cools the inside of a goods hold warehouse in order that this invention may attain the above-mentioned purpose the compressor which compresses a refrigerant, and the aforementioned compressor -- with the condenser which condenses the compressed refrigerant The fan motor which a fan is rotated in the predetermined direction and supplies a cooling wind to the aforementioned condenser, The temperature detection sensor in a warehouse which detects the temperature in the aforementioned goods hold warehouse, and the condenser temperature detection sensor which detects the temperature of the aforementioned condenser, While being based on the temperature in the aforementioned goods hold

warehouse which the OAT detection sensor which detects the surrounding OAT of the aforementioned condenser, and the aforementioned temperature detection sensor in a warehouse detected and turning on / turning off the aforementioned compressor and the aforementioned fan motor The temperature gradient of the temperature of the aforementioned condenser which the aforementioned condenser temperature detection sensor detected, and the aforementioned OAT which the aforementioned OAT detection sensor detected is searched for. The cooling system of the vending machine characterized by having the control means which the aforementioned fan motor is controlled [control means] based on the aforementioned temperature gradient, and make a direction and an opposite direction predetermined [aforementioned] rotate the aforementioned fan is offered. If according to the above-mentioned composition a fan is rotated in the predetermined direction and dust accumulates on a condenser, the air capacity of the cooling style falls, the temperature of a condenser will rise and the heat-exchange performance of a condenser will fall. Moreover, it depends for the temperature of a condenser also on an OAT. Then, when the temperature gradient of the temperature of a condenser and an OAT becomes larger than the temperature gradient set up beforehand, by making a predetermined direction and a predetermined opposite direction rotate a fan, a wind flows to an opposite direction to proper timing at the time of operation, the dust deposited on the condenser is removed, and the heat-exchange performance of a condenser is recovered.

[0008] In the cooling system of the vending machine which cools the inside of a goods hold warehouse in order that this invention may attain the above-mentioned purpose the compressor which compresses a refrigerant, and the aforementioned compressor -- with the condenser which condenses the compressed refrigerant The fan motor which a fan is rotated in the predetermined direction and supplies a cooling wind to the aforementioned condenser, While being based on the temperature in the aforementioned goods hold warehouse which the temperature detection sensor in a warehouse which detects the temperature in the aforementioned goods hold warehouse, and the aforementioned temperature detection sensor in a warehouse detected and turning on / turning off the aforementioned compressor and the aforementioned fan motor It is a predetermined time zone, and when the aforementioned compressor is OFF, the cooling system of the vending machine characterized by having the control means which the aforementioned fan motor is controlled [control means] and make a direction and an opposite direction predetermined [aforementioned] rotate the aforementioned fan is offered. If according to the above-mentioned composition a fan is rotated in the predetermined direction and dust accumulates on a condenser, the air capacity of the cooling style falls, the temperature of a condenser will rise and the heat-exchange performance of a condenser will fall. Then, a predetermined time zone, for example, a morning, when a compressor is OFF, by making a predetermined direction and a predetermined opposite direction rotate a fan, a wind flows to an opposite direction at the time of operation, the dust deposited on the condenser is removed, and the heat-exchange performance of a condenser is recovered.

[0009]

[Embodiments of the Invention] Drawing 1 shows the cooling system of the vending machine concerning the form of operation of the 1st of this invention. The compressor 3 with which this cooling system 1 compresses a refrigerant into the lower part of the main part 2 of a vending machine, The condenser 4 which condenses the refrigerant compressed by the compressor 3, and filter 4a for condensers which can be detached and attached and which was prepared in the front face of a condenser 4, The fan motor 5 for condensers in which the right inversion drive which is made to rotate fan 5a for condensers normally, and supplies 9 of the cooling style to a condenser 4 through filter 4a is possible, The condenser temperature detection sensor 10 which detects the temperature (condenser temperature) of a condenser 4 and outputs a condenser temperature detecting signal is arranged. The evaporator 7 which cools the circumference by the cold energy which the refrigerant condensed by the condenser 4 is evaporated and is obtained in the case of this evaporation in the goods hold warehouse 6 of the upper part of the main part 2 of a vending machine, The fan motor 8 for evaporators which rotates fan 8a for evaporators and circulates the cold from an evaporator 7 compulsorily in the goods hold warehouse 6, and the temperature detection sensor in a warehouse which detects the temperature in the goods hold warehouse 6 (temperature in a warehouse), and outputs the temperature detecting signal in a warehouse and which is mentioned later are arranged.

[0010] Drawing 2 shows the control system of a cooling system 1. The cooling system 1 had the cooling control section 20 which controls this cooling-system 1 whole, connected respectively the above-mentioned compressor 3, the fan motor 5 for condensers, the condenser temperature detection sensor 10, and the temperature detection sensor 21 in a warehouse to the cooling control section 20, and has connected respectively the memory 22 which memorizes various kinds of information, such as temperature set up further beforehand and time, and the timer 23 which clocks elapsed time (accumulation time).

[0011] The cooling control section 12 carries out the inversion drive of the fan motor 5 for condensers to predetermined timing so that filter 4a for condensers may not carry out blinding while performing ON/OFF control of a compressor 3 and the fan motor 5 for condensers so that the temperature in a warehouse to which the temperature in the goods hold warehouse 6 was set may be maintained.

[0012] Next, operation of the form of the 1st operation is explained.

[0013] Drawing 3 shows operation of the fan motor 5 for condensers. The cooling control section 20 performs ON/OFF control of a compressor 3 and the fan motor 5 for condensers so that the temperature in a warehouse to which the temperature in the goods hold warehouse 6 was set based on the temperature detecting signal in a warehouse from the temperature detection sensor 21 in a warehouse may be maintained while clearing the value of a timer 23 based on the input of the seizure signal from the main-control section which is not illustrated. That is, it turns on the fan motor 5 for condensers while it turns on a compressor 3, if the cooling control section 20 goes up to the upper limit temperature to which the temperature in a warehouse was set (normal rotation drive). Fan 5a for condensers rotates normally, a wind 9 flows from the filter 4a side to a condenser 4 side, and a

condenser 4 is cooled. If it falls to the minimum temperature to which the temperature in a warehouse was set, a compressor 3 and the fan motor 5 for condensers are turned off.

[0014] Moreover, the cooling control section 20 makes a timer 23 clock the accumulation time T1 which has exceeded, when a condenser temperature detecting signal is periodically inputted from the condenser temperature detection sensor 10, the setting temperature memorized by condenser temperature and memory 23 is measured and condenser temperature exceeds setting temperature. If condenser temperature falls from setting temperature, the time check by the timer 23 will be stopped. When condenser temperature exceeds setting temperature, a timer 23 is made to clock the accumulation time (t1+t2) which has exceeded again. It reaches at the setting accumulation time when the accumulation time (t1+t2+t3) by the timer 23 is memorized by memory 23, and when a compressor 3 is OFF, the cooling control section 20 clears a timer 23, carries out the inversion drive of the fan motor 5 for condensers, and clocks the time which is carrying out the inversion drive with a timer 23. Fan 5a for condensers is reversed by the inversion drive of the fan motor 5 for condensers, wind 9' flows from a condenser 4 side to the filter 4a side for condensers, and dust, such as dust on filter 4a for condensers and a contaminant, is removed. If the enumerated data of a timer 23 reaches at the setting drive time (for example, 5 minutes) which memory 22 memorizes, a timer 23 will be cleared and the inversion drive of the fan motor 5 for condensers will be stopped.

[0015] Since the inversion drive of the fan motor 5 for condensers was carried out and the dust on filter 4a is removed by the accumulation time which was mentioned above and when condenser temperature exceeded setting temperature according to the gestalt of the 1st operation, the heat-exchange performance degradation of the condenser 4 by the blinding of filter 4a can be prevented. Moreover, it is at the time [need / to be removed / the dust deposited on filter 4a], and since the inversion drive of the fan motor 5 is carried out and a cooling performance is not affected when the compressor 3 turns off, it is not necessary to affect the temperature of cold goods.

[0016] Drawing 4 shows the control system of the cooling system concerning the gestalt of operation of the 2nd of this invention. This cooling system has the cooling control section 20 which controls this cooling-system 1 whole. The memory 22 which memorizes various kinds of information, such as the above-mentioned compressor 3, the fan motor 5 for condensers, the condenser temperature detection sensor 10, the temperature detection sensor 21 in a warehouse, and time set up beforehand, and a timer 23 are respectively connected to the cooling control section 20. The part, and the clock and calendar 24 which output the time entry of a second are respectively connected at a year at present, the moon, a day, and the time.

[0017] Next, operation of the form of the 2nd operation is explained.

[0018] Drawing 5 shows operation of the fan motor 5 for condensers. The cooling control section 20 performs ON/OFF control of a compressor 3 and the fan motor 5 for condensers so that the temperature in a warehouse to which the temperature in the goods hold warehouse 6 was set based on the temperature detecting signal in a warehouse from the temperature detection sensor 21 in a warehouse may be maintained while clearing the value of a timer 23 based on the input of a seizure signal from the main-control section which is not illustrated.

[0019] Moreover, when it judged that the date changed based on the time entry from a clock and a calendar 24 and a compressor 3 is turned off [it] at today's beginning, the cooling control section 20 clears a timer 23, carries out the inversion drive of the fan motor 5 for condensers, and clocks the time which is carrying out the inversion drive with a timer 23. Fan 5a for condensers is reversed by the inversion drive of the fan motor 5 for condensers, wind 9' flows from a condenser 4 side to the filter 4a side for condensers, and the dust on filter 4a for condensers is removed. If the enumerated data of a timer 23 reaches at the setting drive time (for example, 5 minutes) which memory 22 memorizes, a timer 23 will be cleared and the inversion drive of the fan motor 5 for condensers will be stopped.

[0020] According to the form of the 2nd operation, it is a predetermined time zone, and since the inversion drive of the fan motor 5 for condensers is carried out when [at which it mentioned above] a compressor 3 is OFF, like the form of the 1st operation, the heat-exchange performance degradation of a condenser 4 can be prevented, and energy saving becomes possible. Moreover, since it is not necessary to clock accumulation time like the form of the 1st operation, drive control of the fan motor 5 for condensers can be performed easily.

[0021] Drawing 6 shows the control system of the cooling system concerning the gestalt of operation of the 3rd of this invention. This cooling system had the cooling control section 20 which controls this cooling-system 1 whole, and it has connected the OAT detection sensor 25 which detects the temperature of the open air of the condenser 4 circumference while it connects respectively the memory 22 which memorizes various kinds of information, such as the above-mentioned compressor 3, the fan motor 5 for condensers, the condenser temperature detection sensor 10, the temperature detection sensor 21 in a warehouse, temperature set up beforehand, and time, to the cooling control section 20, and a timer 23.

[0022] Next, operation of the gestalt of the 3rd operation is explained.

[0023] Drawing 7 shows operation of the fan motor 5 for condensers. The cooling control section 20 performs ON/OFF control of a compressor 3 and the fan motor 5 for condensers so that the temperature in a warehouse to which the temperature in the goods hold warehouse 6 was set based on the temperature detecting signal in a warehouse from the temperature detection sensor 21 in a warehouse may be maintained while clearing the value of a timer 23 based on the input of the seizure signal from the main-control section which is not illustrated.

[0024] Moreover, the cooling control section 20 is based on the condenser temperature detecting signal from the condenser temperature detection sensor 10, and an OAT detecting signal from the OAT detection sensor 25. When it asks for temperature-gradient deltaT of condenser temperature and an OAT, and the setting temperature gradient this temperature-gradient deltaT is remembered to be by memory 22 is exceeded and the compressor 3 is turned off [it], the cooling

see
Fig 3
accumulation
time.

5 min
cleaning

control section 20 A timer 23 is cleared, the inversion drive of the fan motor 5 for condensers is carried out, and the time which is carrying out the inversion drive is clocked with a timer 23. Fan 5a for condensers is reversed by the inversion drive of the fan motor 5 for condensers, wind 9' flows from a condenser 4 side to the filter 4a side for condensers, and the dust on filter 4a for condensers is removed. If the enumerated data of a timer 23 reaches at the setting drive time (for example, 5 minutes) which memory 22 memorizes, a timer 23 will be cleared and the inversion drive of the fan motor 5 for condensers will be stopped.

[0025] Since the inversion drive of the fan motor 5 for condensers is carried out when [at which it mentioned above] according to the form of the 3rd operation the temperature gradient of condenser temperature and an OAT exceeds a setting temperature gradient and the compressor 3 is turned off [it], like the form of the 1st operation, the heat-exchange performance degradation of a condenser 4 can be prevented, and energy saving becomes possible. Moreover, since the inversion drive of the fan motor 5 for condensers is carried out based on the temperature gradient of condenser temperature and an OAT, the dust on filter 4a is removable to timing more proper than the form of the 1st operation.

[0026] in addition, this invention is not limited to the form of the above-mentioned implementation, but deformation implementation is variously possible for it to various For example, when [whose condenser temperature is predetermined about the temperature set up beforehand] it exceeds the number of times (it contains once), you may reverse fan 4a for condensers. Moreover, when the R/C of condenser temperature becomes larger than the R/C set up beforehand, you may reverse fan 4a for condensers. moreover -- although the time zone which carries out the inversion drive of the fan motor 5 for condensers was set up at once every morning with the form of the 2nd operation -- a day -- one morning and evening each -- as -- one day -- a multiple-times setup -- you may carry out -- what day -- 1 time or how many weeks -- 1 time -- as -- you may set up arbitrarily Moreover, this invention is applicable also to the condenser which is not equipped with the filter.

[0027]

[Effect of the Invention] Since the dust which a predetermined direction and a predetermined opposite direction were made to rotate a fan, and was deposited on the condenser is removed according to the cooling system of the vending machine of this invention when required as explained above, while being able to prevent the heat-exchange performance degradation of the condenser by blinding, the futility of power consumption is excluded and energy saving can be attained.

[Translation done.]